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Migration and Human Capital in Brazil during the 1990s

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Abstract

Nearly 40 percent of all Brazilians have migrated at one point and time, and in-migrants represent substantial portions of regional populations. Migration in Brazil has historically been a mechanism for adjustment to disequilibria. Poorer regions and those with fewer economic opportunities have traditionally sent migrants to more prosperous regions. As such, the southeast region, where economic conditions are most favorable, has historically received migrants from the northeast region. Migration should have benefited both regions. The southeast benefits by importing skilled and unskilled labor that makes local capital more productive. The northeast can benefit from upward pressures on wages and through remittances that migrant households return to their region of origin. The northeast of Brazil is a net sender of migrants to the southeast. In recent years a large number of people moved from the southeast to the northeast. Compared with northeast to southeast (NE-SE) migrants, southeast to northeast (SE-NE) migrants are less homogeneous regarding age, wage, and income. SE-NE migrants are on average poorer and less educated than the southeast average, while NE-SE migrants are financially better off and higher educated than the northeast average. Fiess and Verner find that the predicted returns to migration are increasing with education for SE-NE migrants and decreasing for NE-SE migrants. They further observe that the returns to migration have been decreasing for NE-SE migrants and increasing for SE-NE migrants between 1995 and 1999. This finding helps explain migration dynamics in Brazil. While the predicted positive returns to migration for NE-SE migrants indicate that NE-SE migration follows in general the human capital approach to migration, the estimated lower returns to migration for SE-NE may indicate that nonmonetary factors also play a role in SE-NE migration.

This paper—a product of the Office of the Chief Economist and the Economic Policy Sector Unit, Latin America and the Caribbean Region—is part of a larger effort in the region to understand migration patterns in Brazil. Copies of the paper are available free from the World Bank, 1818 H Street NW, Washington, DC 20433. Please contact Ruth Izquierdo, room I8-012, telephone 202-458-4161, fax 202-522-7528, email address rizquierdo@worldbank.org. Policy Research Working Papers are also posted on the Web at http://econ.worldbank.org. The authors may be contacted at nfiess@worldbank.org or dverner@worldbank.org. July 2003. (39 pages)

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1. Introduction:

Brazil is a country of migrants, with as much as 40 percent of the 170 million people having migrated at some point in their lives. Northeast (NE) Brazil has historically been characterized as a source of migrant outflow. Most out-migrants from the Northeast settled in the Southeast (SE), where the standard of living is significantly higher than the Northeast measured for example by per-capita income or poverty rates. Per-capita GDP in the Southeast exceeded that of the Northeast by nearly 300 percent (R$7,436 and R$2,494, respectively in 1997). In 1999, the headcount poverty rate in the Northeast was 44.3 percent compared to 8.5 percent in São Paulo.

Migration in Brazil has historically been a mechanism for adjustment to disequilibria. Nearly 40 percent of all Brazilians have migrated at one point and time, and in-migrants represent substantial portions of regional populations. Poorer regions and those with fewer economic opportunities have traditionally sent migrant to more prosperous regions. As such, the Southeast, where economic conditions are most favorable, has historically received migrants from the Northeast. Migration should have benefited both regions. The SE benefits by importing skilled and unskilled labor that makes local capital more productive. The NE can benefit from upward pressures on wages and through remittances that migrant households return to their region of origin.

Migration has consequences for households, regions, and the nation as a whole. At the individual level, migration can be viewed as a response to economic opportunity: people migrate seeking higher returns to their individual attributes so we would expect household well being to be associated with migration status. At the regional level, migration flows have consequences for labor markets, public expenditure and investment, and the overall prospects for economic development. As individual migration decisions respond to economic opportunities, we would expect that aggregate migration would reflect relative resource scarcities and act as a "market mechanism" to equalize relative endowments over regions. Thus, aggregate flows of migration should produce downward pressure on wages in receiving areas and upward pressure on sending areas. State governments are also aware that rapid migration, if it is significantly large relative to existing population bases, may place additional stress though its impact on congestion in public services. At the national level, Brazil's economic development prospects can be enhanced by efficient migration that responds to relative factor shortages. In fact, the Brazilian government has used migration as a component of its national development strategy; in the 1960s and 1970s, migration into the Amazon was used to relieve population pressures in the Southeast and provide development resources for the national economy.

Information about migration flows are important for public policy. Migration patterns are influenced by development policy and public sector investments, especially investments in human capital. In turn, the effectiveness of these policies in improving well being depends, to some extent, on human responses such as migration decisions. Policy can be better informed by good information on overall patterns of migration, characteristics of migrant families, and the impacts of migration on local labor markets, household well-being, and demand for public services. Therefore, it is of critical

importance to policy makers to understand the determinants of migration flows into and out of the Northeast states as well as rural-urban migration within a state.

Why has migration failed to equalize real regional incomes? At least four plausible explanations for this failure emerge. First, all the migration prospects have, in fact, migrated and that differences in standard of living are due to differences in the human capital bases of the remaining population. That is, because of low levels of education, old age, or poor health status, the remaining population in regions such as the Northeast would be poor no matter where it resided. The second explanation relates to the first, the disparities in regional levels of well-being are due to differences in the distribution of occupations due to long-term investments in business capital. That is, there may be no difference in remuneration for the same job across the regions, but one region has more well-paying jobs because private industry has traditionally invested there. Third, migration has run its course and regional differences in levels of living are due to differences in costs of living. Finally, standards of living have not equalized due to market failures and constraints (perhaps discrimination) faced by migrants into areas such as the Southeast.

The main purpose of this paper is to shed light on how migration flows between Northeast and Southeast Brazil have affected well-being in the Northeast. More specifically, the direction of migration flows, the characteristics of migrants and their household, and some of the determinants of migration. The paper is organized in six sections. Section 2 contains an overview of migration dynamics in Brazil. Section 3 provides information on socioeconomic indicators for migrants and non-migrants in receiving and sending areas. Section 4 assesses the human capital approach to migration. Section 5 focuses on migration and schooling of children. Finally, section 6 concludes.Additionally, this paper has two appendices. Appendix A contains population figures by state level for 1999. Appendix B contains information on the labeling of the variables.

2. Migration patterns within Brazil

This section of the paper describes broad patterns of migration within Brazil using the 1999 PNAD data and the 2000 Census. A migrant, for the purposes of this study, is defined as a person who changed state of residence over a defined period of time. Inter-regional migration over the entire lifetime of the migrant and migration over the past ten years are examined, sending and receiving regions are identified and flows between these regions are documented. Since the largest flows of migration historically occurred between the Northeast (NE) and Southeast (SE) regions, these inter-regional flows are analyzed in more detail.

Data

The PNAD is an annual national household survey conducted and performed by IBGE, the Brazilian Census Bureau, in the third quarter of each year. The data are derived from interviews of approximately 100,000 households. The survey began at national level in

1971 and underwent major revision between 1990 and 1992. This revision has made it difficult to obtain full compatibility of data between the PNAD before and after 1992; and since we do compare data across decades, this is important to keep in mind. The survey contains extensive information on personal characteristics, including information on income, labor force participation, educational attainment, and school attendance. Ferreira, Lanjouw, and Neri (1999) discuss shortfalls of the PNAD data and find that the PNAD underestimates incomes, and most seriously so in rural areas. The PNAD also does not allow us to analyze intra-state migration decisions, and its relatively small sample size limits, in some cases, the ability to analyze determinants of migration. The income data are adjusted by the local cost of living in accordance with the estimations of Ferreira, Lanjouw, and Neri.[1]

2.1 Major Migration Routes within Brazil

The Northeast region of Brazil includes nine of Brazil's 23 states: Alagoas, Bahia, Ceará, Maranhão, Pernambuco, Paraíba, Piauí, Rio Grande do Norte and Sergipe. It covers about 1.5 million square kilometers, over 18 percent of Brazil's total area. In 1998, total population of the Northeast was 47.7 million or about 28 percent of Brazil's total population. In 1998, Northeast GDP accounted for about 13 percent of Brazil's GDP and per-capita GDP in Northeast was only 46 percent of the average GDP in Brazil. In 1999, the poverty rate, measured by per-capita income and the indigent poverty line, in the Northeast was about 44 percent compared to 23 percent elsewhere and still disproportionately rural (see Fiess and Verner 2001). In contrast, the four states in the Southeast (Rio de Janeiro, São Paulo, Mato Grosso, Espirito Santos) which occupy only 11 percent of land area, accounted for 43 percent of total population and around 60 percent of Brazilian GDP. Finally, the poverty rate in the state of São Paulo is 9 percent, hence less than a fifth of the poverty rate in the Northeast.

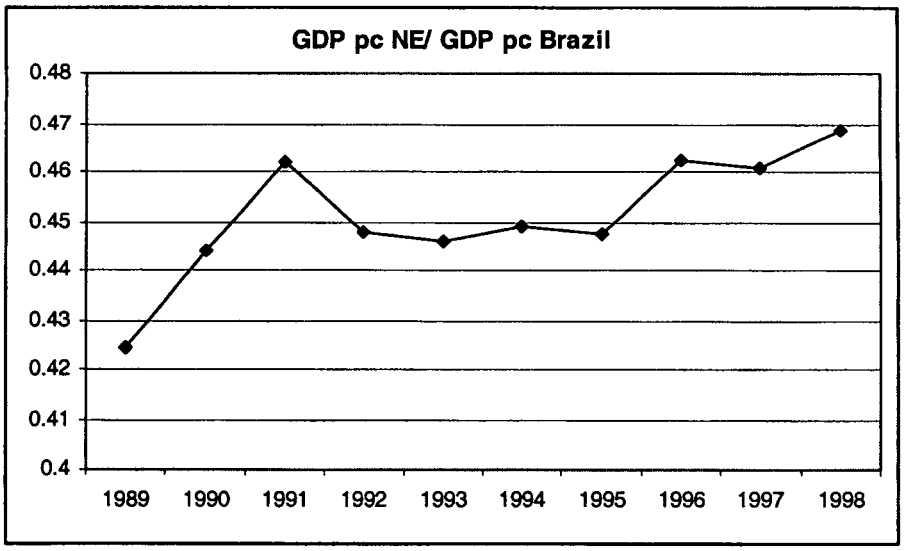
The disparity between the Northeast and the Center-South of Brazil goes back centuries. In the late 1800 the Northeast economy was heavily dependent on sugar but started to lose ground to the Center-South, with the increased demand for coffee. Several factors, including recurrent droughts, contributed to a rapidly growing socioeconomic gap between the two regions. The relative decline of the Northeast ceased only in the 1960s when the federal Government initiated broad-based measures to support development of the region. These measures helped stabilize the Northeast economy and modernize the industrial sector. The gap in per-capita incomes between the Northeast and the rest of Brazil worsened in the 1970s and recovered in the 1980s. A deeper analysis reveals that

[1] A note of caution is in order. Since the PNAD is not stratified for the purpose of migration, an expansion from sample values to total population figures might not be representative. The PNAD may be incorrectly estimating migration. Comparing our figures with the Census data, we find that our methodology yields higher migration estimates than the Census. The higher estimates of the PNAD are at least partly due to a conceptual difference in the two survey instruments; the Census classifies a person who has lived 5 years ago in a different state as a migrant. For example, a person who lived in 1991 in Piauí moved in 1993 to Pernambuco and back then in 1995 back to Piauí will not be classified as a migrant. As we consider annual migration data, our methodology captures migration at a higher frequency.

not only are the Nordestinos more than five times more likely to fall below the "food-only" or indigent poverty line compared to *Paulistas* they are also 25 percent more likely to do so when education, skills, and other individual characteristics are taking into account.

Poor states are catching up with rich states in Brazil. The Northeast is catching up with the richer regions in Brazil and has on a per-capita GDP basis been growing faster than Brazil as a whole over the last ten years.[2] Figure 2.1 plots the ratio of per-capita GDP of the Northeast region relative to that of Brazil during 1989-98. Since 1995 growth in the Northeast has been faster than the Brazil average. Macroeconomic stabilization in the aftermath of the inflation-beating Real Plan of 1994, trade liberalization at the beginning of the 1990s, as well as a pronounced investment effort in the Northeast all had a positive impact on growth in the Northeast.

Figure 2.1: Per-capita GDP in Northeast relative to Brazil (1989-98)



Source: Carrizosa, Fiess, and Verner (2001) based on data from *Contas Regionais do Brasil.*

According to the PNAD 1999, 33.5 million Brazilians have a history of migration between states during any time in their life (Table 2.1). The largest share of these lifetime migrants came from the SE (35 percent) followed by the NE region (32 percent). Migration between different states in the same region appears to be of particular importance, and 28 percent of the migration in the NE is intra-regional migration, which is the lowest in Brazil. For example, about one-half of the migration observed in the SE occurred within the SE. The respective figures for the South, North, NE and Center regions are 42 percent, 35 percent, 28 percent, and 31 percent respectively.

[2] Estimating geometric growth rate from recently released GDP data from *Contas Regionais do Brasil* (IBGE), 1985-1998, Carrizosa, Fiess, and Verner (2001) find that during 1985 – 97 per-capita GDP in the Northeast increased by 3.7 percent while per-capita GDP in Brazil increased by 3.0 percent.

Table 2.1: People Ever Migrating in Brazil, by Source and Destination

	Migrating FROM:						
Migrating TO:	**North**	**NE**	**Southeast**	**South**	**Center**	**Foreign**	**Total**
North							
(1)	685,678	709,162	234,771	169,559	407,640	27,391	2,234,201
(2)	2%	2.1%	1%	0.5%	1%	0.1%	6.7%
(3)	34.9%	6.6%	2.0%	3.5%	12.7%	2.8%	6.7%
Northeast							
(1)	488,148	3,026,405	2,656,383	113,007	427,722	35,437	6,747,102
(2)	1%	9.0%	8%	0.3%	1%	0.1%	20.1%
(3)	24.8%	28.0%	22.8%	2.3%	13.3%	3.7%	20.1%
Southeast							
(1)	300,535	5,902,227	5,732,500	1,995,336	1,049,890	590,886	15,571,374
(2)	0.9%	17.6%	17.1%	6.0%	3.1%	1.8%	46.4%
(3)	15.3%	54.7%	49.2%	40.7%	32.6%	61.4%	46.5%
South							
(1)	96,581	194,943	1,580,652	2,062,362	338,730	243,819	4,517,087
(2)	0.3%	0.6%	4.7%	6.2%	1.0%	0.7%	13.5%
(3)	4.9%	1.8%	13.6%	42.1%	10.5%	25.3%	13.5%
Center							
(1)	395,375	957,907	1,450,508	561,689	993,726	65,477	4,424,682
(2)	1.2%	2.9%	4.3%	1.7%	3.0%	0.2%	13.2%
(3)	20.1%	8.9%	12.4%	11.5%	30.9%	6.8%	13.2%
Total							
(1)	1,966,317	10,790,644	11,654,814	4,901,953	3,217,708	963,010	33,494,446
(2)	5.9%	32.2%	34.8%	14.6%	9.6%	2.9%	100%
(3)	100%	100%	100%	100%	100%	100%	

Note: (1) Total head of households that migrated, (2) percentage share of total migrants, (3) percentage share of migrants from total migrants from a state. The PNAD does not provide information about emigration, as the respondent would have to be present in Brazil.
Source: Author's own calculations based on PNAD 1999.

The major inter-regional migration route is from the NE to the SE (NE-SE). About 18 percent of all Brazil's migrants and 55 percent of migrants from the NE have taken this route. The second most important migration route is from the SE to the NE (SE-NE); 8 percent of all migrants and 23 percent of migrants from the SE chose this route. Other important migration routes are: South to SE, SE to South, Center to SE, and SE to Center. The SE region has clearly been the most important sender and receiver of migrants in Brazil. Migration from the North region has been least important in absolute magnitude, but the North is also the least-populated region in Brazil.

In the last decade a slightly different migration pattern emerges (Table 2.2). A total of 11.2 million people in Brazil migrated over the last ten years. The largest share of recent migrants came from the SE (35 percent), followed by the NE (29 percent); this is roughly the same pattern as found for lifetime migration (compare Tables 2.1 and 2.2). The SE is still the main migrant-receiving area. Its positive value was about 0.6 million individuals during 1996-2000, down 7 percent in 10 years (census 2000). NE has grown

in prominence. During 1995-2000, the NE received 0.5 million migrants (including return-migrants), but 1.5 million left the NE (up 8 percent in 10 years) and 71 percent hereof moved into the SE region (census 2000).

Table 2.2: People Migrating in Past 10 Years, by Source and Destination

	FROM:						
	North	**NE**	**Southeast**	**South**	**Center**	**Foreign**	**Total**
TO:							
North							
(1)	301,600	237,137	82,424	36,682	156,781	12,748	827,372
(2)	2.7%	2.1%	0.7%	0.3%	1.4%	0.1%	7.4%
(3)	31.7%	7.2%	2.1%	2.8%	11.4%	3.8%	7.4%
Northeast							
(1)	266,150	1,029,772	1,340,810	37,094	230,868	16,381	2,921,075
(2)	2.4%	9.2%	12.0%	0.3%	2.1%	0.1%	26.0%
(3)	27.9%	31.3%	34.1%	2.8%	16.9%	4.8%	26.1%
Southeast							
(1)	124,193	1,622,377	1,588,090	426,396	397,765	137,476	4,296,297
(2)	1.1%	14.5%	14.2%	3.8%	3.5%	1.2%	38.3%
(3)	13.0%	49.4%	40.4%	32.0%	29.0%	40.5%	38.3%
South							
(1)	52,198	58,736	505,191	683,846	183,571	142,427	1,625,969
(2)	0.5%	0.5%	4.5%	6.1%	1.6%	1.3%	14.5%
(3)	5.5%	1.8%	12.9%	51.3%	13.4%	42.0%	14.5%
Center							
(1)	208,350	337,661	410,044	149,213	400,296	30,030	1,535,594
(2)	1.9%	3.0%	3.7%	1.3%	3.6%	0.3%	13.7%
(3)	21.9%	10.3%	10.4%	11.2%	29.2%	8.9%	13.7%
Total							
(1)	952,491	3,285,683	3,926,559	1,333,231	1,369,281	339,062	11,206,307
(2)	8.5%	29.3%	35.0%	11.9%	12.2%	3.0%	
(3)	100%	100%	100%	100%	100%	100%	

Source: Author's own calculations based on PNAD 1999.
Note: (1) total migrants, (2) percentage share of total migrants, (3) percentage share of migrants from total migrants of a state.

SE-NE migration increased over the last 10 years, while NE-SE migration has declined. Over the past 10 years, a substantially higher percentage (34 percent compared to 23 percent) of total migrants from the SE located in the NE; these migrants also became a larger proportion of total in-migrants into the NE (45 percent compared to 39 percent).

Table 2.3: Migration Net Flows, by Region and Reference Period

	Ever Migrating		**Demographics**
Region:	% of regional population from net migration	% of total Brazilian population from net migration	% regional pop./total pop. of Brazil

North	3.3	0.2	4.8
Northeast	-8.7	-2.5	29.0
Southeast	5.6	2.4	43.7
South	-1.6	-0.2	15.3
Center	10.7	0.8	7.0

Source: Author's own calculations based on PNAD 1999.
Note: Total migrants are all the people with a history of migration, i.e. people who have indicated in the PNAD 1999 that they had migrated prior to 1990 (with unspecified date of migration) or post 1990 (at a specific point in time after 1990). A negative sign indicates a net outflow of migrants.

Migration has substantially increased the population in the SE and Center regions, as net migration over the lifetime is responsible for 5.6 percent and 10.7 percent of the regional population, respectively (Table 2.3). In contrast, the current NE population is almost 9 percent lower than it would have been without migration, reflecting its historical position as a net sender of migrants.

In the following section, we turn to the characteristics of migrants in order to understand how they make their decisions to migrate, and how the decision affects their well-being. This information will provide additional insights into the impacts of migration on regional and household well-being.

3. Characteristics of migrants

The impacts of migration on the Northeast and Southeast regions and on migrant households are of particular interest to policymakers. To understand these impacts, we construct a profile of inter-regional migrants. In the profile, a person is classified as having out-migrated if he/she lived in the past in the NE and currently lives in the SE; in-migration is classified correspondingly. A household is defined as a migrant household if the household head migrated during the reference period.

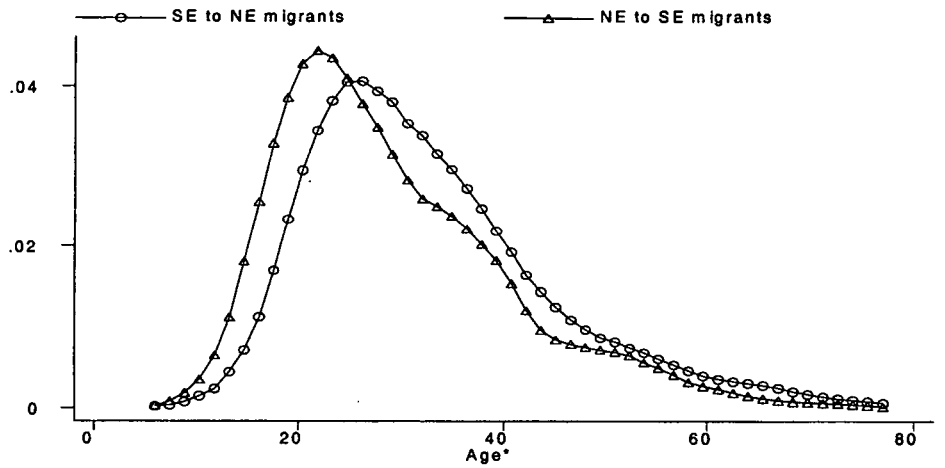
This section is organized in two subsections. In the following subsection, we first examine general characteristics of migrant household heads such as their age, gender, educational attainment, and location choice. Second, we analyse differences between migrants and non-migrants in receiving areas and differences between migrants from the NE and SE and other residents of the respective areas. In the second section, we turn to the economic consequences of migration decisions. We analyze first the relationship between migration and household poverty status and differences in incomes between migrant and non-migrant households and second, we examine participation in workforce, sector of employment, and earnings/wages of migrants.

3.1. Education and Demographics

Age, Gender, and Race

Recently the view has emerged that a large part of migration to the Northeast is return-migration. If this is the case, we would expect that NE-SE migrants are significantly older than SE-NE migrants. While NE-SE migrants tend to be older than SE-NE migrants, the difference is not very pronounced (see Figures 3.1 and 3.2). The Southeast-to-Northeast ever-migrated age distribution shows the typical bimodal behavior of most migration studies, which is less pronounced for Northeast-to-Southeast migrants (Figure 3.2). Average family size for Southeast-to-Northeast migrants is 3.6 compared to 3.4 for migrants in the opposite direction.

Figure 3.1: Age distributions of Migrants over last 10 years – age at time of migration (Household heads only)

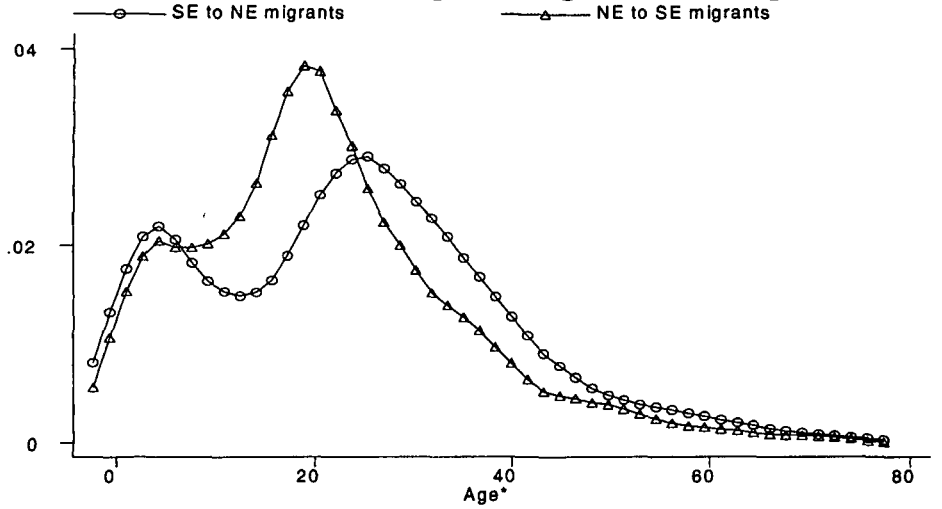


Source: Author's own calculations based on PNAD 1999. Estimates based on Epanechnikov kernel density estimates with a width of approximately 20.

The PNAD contains limited information on return-migration. We adopt the following simplified definition for return-migrants. A migrant is classified as returning if he/she were born in the same region as he/she is currently residing but has a history of living in a different region. Interestingly, return migration is an issue for migration to the NE, but less important for migration to the SE. Around 25 percent of all migrants from the SE to the NE are return-migrants, and the proportion of return-migrants from the NE to the SE is only 3 percent (Table 3.1).[3]

[3] One caveat to keep in mind is that the actual number of returning migrants in Table 3.1 might be understated since children of return-migrants who are born before returning home should effectively also be classified as return-migrants and not migrants.

Figure 3.2: Age distribution of all migrants – age at time of migration



Source: Author's own calculations based on PNAD 1999. Estimates based on Epanechnikov kernel density estimates with a width of approximately 20.

Table 3.1: Return migrants to Northeast and Southeast

	Return migrants from Southeast to Northeast (percent)	**Return migrants from Northeast to Southeast** (percent)
Total reported return migration:	25.1	2.6
in last 10 years:	21.7	3.6
in 1999:	22.3	8.7
in 1998:	20.7	2.9
in 1997:	20.5	2.1
in 1996:	15.0	2.4
in 1995:	22.5	1.1
in 1994:	19.8	6.4
in 1993:	22.6	1.8
in 1992:	28.4	5.0
in 1991:	31.5	6.7
in 1990:	24.7	5.1

Source: Author's own calculations based on PNAD 1999.
Note: Return migrants expressed as percentage share of total migrants to Northeast (column 1) and to Southeast (column 2).

Gender

Males are clearly more likely to move than females (Table 3.3). Around 75 percent of households with a history of migration from the NE to the SE are male headed. Migrants from the SE to the NE are even more likely to be male (averaging about 78 percent male).

In all cases, the proportion of migrating males is higher than their proportion as heads of households in both regions.

Race is also important (Table 3.3). White people are the predominant racial class for NE-SE migrants. This contrasts SE-NE migration, which is led by non-whites, . In recent years, however, the predominance of whites in NE-SE migration has fallen and whites now represent less than half of the migrant stream. The number of NE mulattos and blacks migrating to the SE is growing in recent years relative to other segments of the migrant population. The racial distribution of migrant flows follows, to some extent, the distribution of races in the receiving regions. The NE is predominantly non-white, while whites are the most common racial group in the SE. Whites are also predominantly less poor than non-whites at a regional level as well as national level (Fiess and Verner, 2001).

Educational Attainment of Migrants Matters People in the Southeast tend to be better educated than people in the Northeast. Average years of schooling for the total population in the Southeast was 6.2 years in 1999 compared to 3.9 years in the Northeast (Table 3.3).[4] This pattern is weakly reinforced by migration patterns. People who recently migrated from the Northeast to the Southeast tend to be better educated than people who move from the Southeast to the Northeast (see Table 6). NE-SE migrants who moved in the last 5 years had an average of 5.4 years of schooling, compared to 4.5 years for SE-NE migrants. Furthermore, migrants into the NE are far better-educated than the general NE population, and migrants that arrive in the SE have education levels that are lower than those of the SE population. While the difference in education between migrants to the two regions might appear quite small, it should be viewed within a regional context. One should therefore keep regional differences in education in mind when assessing the impact of education on migration.

Urban-Rural Location About 95 percent of people migrating from the NE to the SE end up in urban areas, while migration from the SE to the NE is less predominately urban in its destination. About 30 percent of ever migrated SE-NE migrants end up in rural areas, and more recently the trend toward SE-NE rural migration has increased. In 1991, 36 percent of SE-NE migrants settled in rural areas, but this figure increased in 1999 to 38 percent.[5] Without more information on the immediate location decisions of

[4] Fiess and Verner (2001) point out that in 1996 the literacy rate in the Northeast had not even reached the level of literacy of the Southeast of 1970 and further, that in 1998 the average effective education of the poor in São Paulo (5.1 years) nearly equaled the average effective education of the non-poor in Rio Grande do Norte (5.2 years).

[5] Note that the PNAD 1999 only provides information that a person that migrated, e.g., in 1991 from the Southeast to the Northeast currently lives in a rural areas. We do not know if this person settled in 1991 in a rural area; table 5 compares current residence of people who migrated in each year by year of migration. Over time, if there is a general trend toward rural to urban migration within states, we would expect the marginal share of inter-state migrants who locate in urban areas to exceed the average (which is indeed what we observe).

recent migrants, it is not possible to conclude that there is an upward trend in the propensity of recent migrants to locate in rural areas in the NE.

Sector of employment. The higher percentage of SE-NE migration to rural areas of the NE is reflected in the respective employment sectors of migrants. The largest part of SE-NE migrants appear to find employment in agriculture (36 percent), while for NE-SE migrants employment in agriculture is far less important (6 percent). NE-SE migrants predominantly appear to work in the secondary and tertiary sectors (see below).

3.2. Poverty and Labor Force Participation

Poverty

SE-NE migrants are significantly more likely to be poor than NE-SE migrants; 13.4 percent (10.4 percent) of people who lived since 1994 (prior to 1994) in Northeast and are now residing in the Southeast are poor, while 56.2 percent (42.5 percent) of people who lived since 1994 (prior to 1994) in the Southeast and are currently living in the Northeast are poor (Table 3.3). Recent SE-NE migrant families do, however, appear to be more likely to be poor than the rest of the NE population. In contrast, NE-SE migrants show about the same propensity to be poor as the rest of the SE population.

Evidence exists of a negative correlation between poverty and the time spent in a new state. People who migrated more than 10 years ago are less likely to be poor than people who migrated in the last 5 years in both regions (Table 3.4). It is difficult to determine how much of this reduced propensity to be poor is due to an age or experience effect (older household heads tend to be financially better off than younger household heads) or a resettling effect (resettling after migration might cause financial hardship and hence migrants are likely to experience a temporary drop in their living standard).

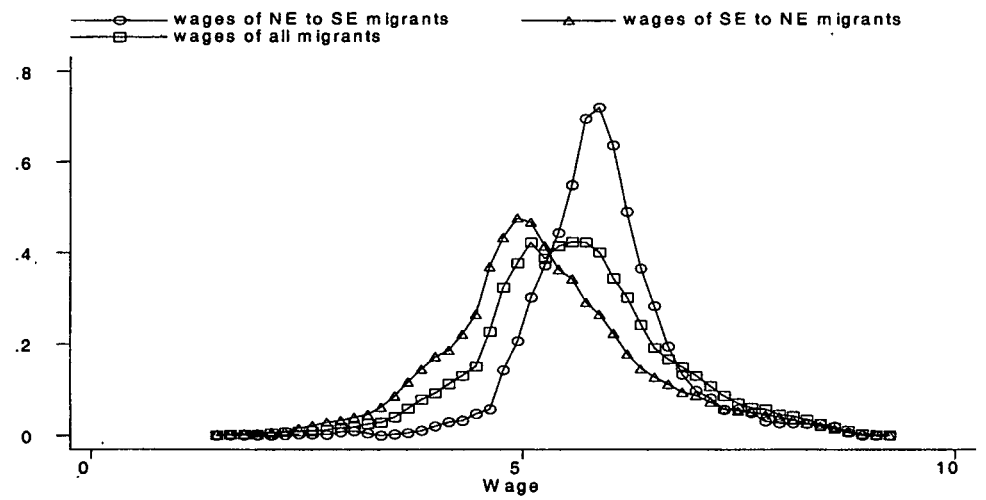
Income and Earnings

The higher prevalence of poverty among recent migrants might be partly due to earnings differentials. For example, several theoretical models of migration show that a typical pattern for rural-urban migrants is to begin working in the informal sector, where rates of remuneration tend to be lower, and gradually, through search and increased networking, move into higher-paying formal sector jobs. Mean incomes for migrants do appear to be increasing over time for migrants to both areas (Tables 3.3 and 3.4). Recent NE-SE (SE-NE) migrants earn R$291 (R$136), but over time the averages increase to R$304 (R$186). Annual trends for migrants from the NE to the SE, however, seem to signal a slight shift in patterns. During the last 5 years, NE-SE migrants are, on average, earning higher incomes than the 10-year average, which indicates that fortunes of recent migrants are improving. This improvement does not seem to be reflected in better educational attainment; new migrants have higher levels of education (Table 3.4).

Migrants into the NE from SE tend to earn lower incomes relative to the NE population as a whole (R$136 versus R$179), and substantially lower incomes than the average person who stayed in the SE. Migrants into the SE, while earning lower incomes than the prevailing SE residents, are considerably better off than those who stayed in the NE. These findings do not control for educational attainment, and confirmation of wage premia from migration will be investigated in more detail below.

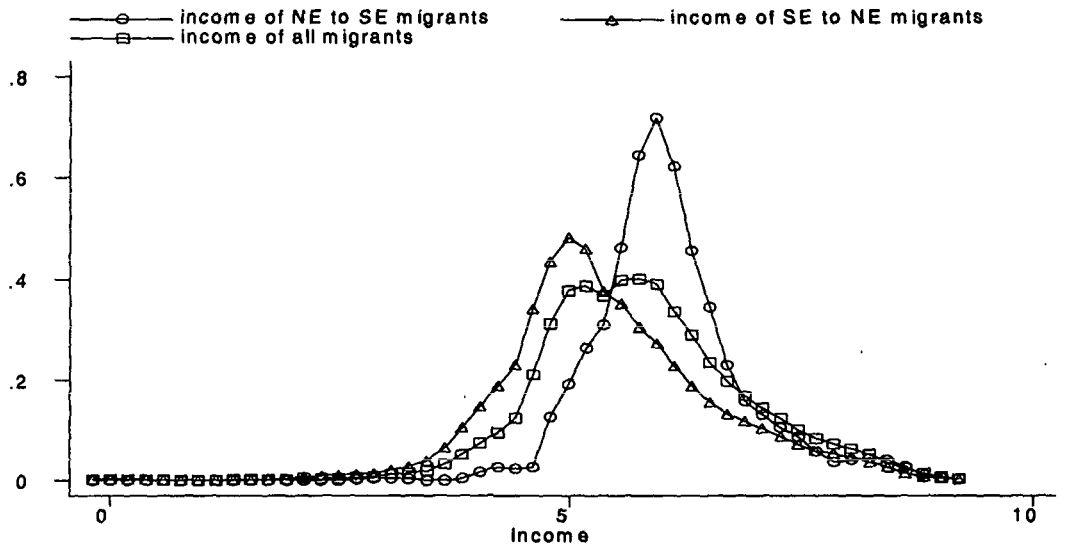
As expected, the bulk of the densities of 1999 wages and incomes from NE-SE migrants is found to the right of those of SE-NE migrants (Figures 3.3 and 3.4). These densities reflect, to some degree, the generally higher standards of living in the SE, but the shapes of the distributions are also notable. The fact that the wage and income distributions for SE-NE migrants are more dispersed (have a larger variance), gives reason to believe that SE-NE migrants are more heterogeneous. This heterogeneity is consistent with the evidence on age and educational attainment (section 3.1).

Figure 3.3: Log Wage Densities for NE and SE migrants in 1999



Note: Distribution of log-transformed monthly wages for migrants over the last 10 years based on PNAD 1999. Population aged 18 and above. Estimates based on Epanechnikov kernel density estimates with a width of approximately 20.
Source: Author's own calculations

Figure 3.4: Log Income Densities for NE and SE Migrants in 1999



Note: Distribution of log-transformed monthly income for migrants over the last 10 years based on PNAD 1999. Household heads only. Population aged 18 and above. Estimates based on Epanechnikov kernel density estimates with a width of approximately 20.
Source: Author's own calculations.

Labor Market Participation

Recent migrants into both areas are far more likely to be active in the labor market than their regional counterparts (Table 3.3). While rates of employment for recent and long-term migrants into both regions are slightly lower than regional averages, rates of participation (93 percent of recent NE-SE and 85 percent of recent SE-NE migrants are active in the labor force) are higher for recent migrants. Long-term NE-SE migrants are about as active as the entire SE population in the labor market, but all migrants from the SE-NE are much more likely to participate than the NE population. SE-NE migrants are participating to a lesser extent than NE-SE migrants in the labor market. The percentage of inactive migrants (not part of the active population) is close to 16 percent for SE-NE migrants as compared to 7 percent for NE-SE migrants. Given that SE-NE migrants are on average slightly older, this could indicate that a certain percentage of SE-NE migrants go to or return to the Northeast to retire.

Once migrants decide to participate in the labor force, there are only minimal differences in rates of employment across the regions and between migrants and non-migrants. In the NE, both recent and long-term migrants are employed at slightly lower rates than regional averages (the employment rate for migrants into the NE is about 92 percent, while the regional average is around 95 percent). In the SE, a similar but slightly less pronounced pattern emerges.

Southeast to Northeast migrants appear to begin their employment in the informal sector and, over time, shift to the formal sector. Formal sector employment for recent

SE-NE migrants averages around 39 percent, compared to a NE regional average of 45 percent. Over time, however, these migrants apparently move to the formal sector, as the propensity to work in the formal sector of people who migrated SE-NE any time in their life rises to about 46 percent. Migrants from the NE to the SE appear to be much more quickly incorporated into the formal sector, as recent NE-SE migrants work about 70 percent of the time in the formal sector. Migrants, whether recent or not, into the SE are about as likely as the rest of the SE population to be employed in the formal sector and much more likely than the population they left in the NE.

Recent migrants into the NE from the SE tend to be employed in agriculture, services, and construction, with agricultural employment dominating. Longer-term migrants tend to settle into agriculture, services, and commerce. The employment patterns of SE-NE migrants do not differ much from those of all NE residents, but are very different from residents of SE, whether migrants or not. In the SE, manufacturing, construction, and services occupy much more prominent positions in the local economy than in the NE.

In sum, there exist significant differences between migrants to the two regions. SE-NE migrants tend to be more likely to be poor and are less educated than the Southeast average. NE-SE migrants are financially better off and more highly educated than the Northeast average. SE-NE migrants tend also to be less educated and worse off economically than NE-SE migrants. Thus, there is evidence of a continuing brain drain from the NE, whereby migration to the SE, on net, reduces levels of human capital in the NE. Further, NE-SE migration is predominately into urban areas, while SE-NE migration to rural areas is on the increase.

Moreover, SE-NE migrants are less homogeneous regarding age, wage and income, which may indicate that economic returns seem not exclusively to influence the migration decision; more will be said about this below. Finally, higher levels of education and higher probability of formal employment amongst migrants to the Southeast provide evidence that migration to the Southeast falls at least partly into the category of contracted migration, i.e. migrants hold already a work contract prior to migration. The relatively higher share of informal employment amongst recent migrants to the Northeast seems on the other hand to indicate that a large part of Northeast migration is driven by job-search migration, i.e. workers migrate without a work contract in the hope of finding employment in the new region.

Table 3.3: Characteristics of migrants and non-migrants (HH heads only)

	Northeast to Southeast migrants		Southeast to Northeast migrants		NE residents	SE residents
	Since 1994	Total		Total		
Personal Data:	**in percentage of total migrants**				**in percent of total population**	
Male	77.1	75.0	77.9	78.5	73.1	73.2
Female	22.9	25.0	22.1	21.5	26.9	26.8
Race						
White	48.3	54.4	33.17	36.4	30.7	64.8
Black	6.4	5.7	2.4	3.7	6.9	7.6
Mulatto	45.0	39.5	63.6	59.7	62.2	26.8
Location						
Urban	95.0	96.1	63.8	69.6	66.8	89.7
Rural	5.0	3.9	36.2	30.4	33.2	10.3
Education:			**in years**			
level of education	5.47	4.87	4.50	4.71	3.9	6.2
Employment:	**in percentage of total migrants**				**in percent of total population**	
Active	92.9	77.0	84.8	83.4	78.9	76.2
Inactive	6.9	23.0	15.2	16.6	21.1	23.7
Employed	93.0	92.2	91.9	91.1	95.1	93.9
Unemployed	7.0	7.8	8.1	8.9	4.9	6.1
Formal	70.7	73.1	35.7	46.0	45.4	69.4
Informal	29.3	26.9	64.3	54.0	54.6	30.6
Sector						
Agriculture	6.1	4.5	35.9	33.1	37.3	13.1
Manufa.	13.0	16.2	7.7	7.7	7.5	15.5
Construction	19.7	15.0	14.8	9.9	8.6	10.2
Other industries	1.2	1.4	1.1	1.1	1.4	1.8
Commerce	11.8	13.8	10.0	12.8	12.4	13.2
Services	30.7	29.5	13.2	14.4	13.8	20.0
other services	3.2	3.2	1.7	2.5	2.2	4.9
transport & communic.	5.8	7.3	5.9	5.6	4.4	6.7
Social	3.5	4.9	3.9	6.0	6.0	7.1
Public Admin.	2.8	3.0	4.1	5.0	4.7	5.3
Other	2.3	1.3	1.9	2.0	1.6	2.3
Total	100	100	100	100		
Income:[6]						
Income	291.44	304.35	136.40	186.30	178.72	389.50
			poverty headcount (percent)			
P0	13.4	10.4	56.2	42.5	44.3	11.9

Source: Author's own calculations based on PNAD 1999.

[6] All income figures are in reals and 1997 prices. P0 is the poverty head count based on a poverty line of R$65.

Table 3.4: Annual Break-down of Migration Characteristics (HH heads only)

Southeast to Northeast

	white	non-whites	male	female	P0	urban	rural	age*	income	study
1999	35.5	64.5	72.4	27.6	59.2	62.1	37.9	34.32	92.45	4.63
1998	27.2	72.8	77.3	22.7	59.4	65.8	34.2	33.9	114.78	4.31
1997	36.2	63.8	82.9	17.1	51.9	63.8	36.2	33.0	167.11	4.80
1996	38.2	61.8	80.4	19.6	59	57	43	31.0	120.63	4.28
1995	32.1	67.9	79.7	20.3	48.9	69.8	30.2	32.69	212.11	4.5
1994	44.4	55.6	80.3	19.7	57.6	72.7	27.3	34.62	218.09	4.41
1993	37.3	62.7	75.7	24.3	41.2	72.5	27.5	35.52	161.68	5.43
1992	39.9	60.1	80.2	19.8	41.7	66	34	35.05	153.19	4.53
1991	34.7	65.3	79.4	20.6	41.3	74.5	25.5	32.92	135.85	4.85
last 5 years	35.1	64.9	76.2	23.8	56.4	68.8	31.2		137.30	4.50
last 10 years	35.2	64.8	78.4	21.6	52.7	66.4	33.6		146.42	4.61
more than 10 years	37.3	62.7	78.5	21.5	34.9	72.0	28.0		215.45	4.78

Northeast to Southeast

	white	non-whites	male	female	P0	urban	rural	age*	income	study
1999	58.3	41.7	80.9	19.1	18.7	85.4	14.6	35.45	554.45	6.73
1998	59.8	40.2	67.9	32.1	12.7	94.7	5.3	33.32	328.40	5.66
1997	60.3	39.7	75.6	24.4	13.5	94.3	5.7	29.44	331.50	6.15
1996	33.9	66.1	78.2	21.8	12.1	95.2	4.8	30.1	224.90	4.85
1995	54.9	45.1	71.5	28.5	13.9	96.8	3.2	27.63	254.30	5.20
1994	53.1	46.9	76	24	13.5	94.5	5.5	28.64	290.00	5.15
1993	57.0	43.0	77.2	22.8	7.5	96	4	29.45	283.00	6.40
1992	52.2	47.8	83.7	16.3	16.7	96	4	27.73	208.00	5.20
1991	52.2	47.8	77.7	22.3	10.6	96.2	3.8	29.66	275.70	5.80
last 5 years	47.5	52.5	77.4	22.6	13.5	93.9	6.1		290.10	5.40
last 10 years	51.2	48.8	76.8	23.2	12.7	95.5	4.5		280.00	5.56
more than 10 years	55.1	44.9	74.6	25.4	9.8	96.2	3.8		309.90	4.72

* Age at year of migration. *Source:* Author's calculations based on PNAD 1999.

4. Economic Returns to Migration

Economic theory predicts that migration acts as an adjustment mechanism to differentials in income and unemployment rates between regions. According to neoclassical growth theory, the mobility of the workforce is driven by a search for higher remuneration. High remuneration is given in areas where labor is relatively scarce. Furthermore, since regions with higher capital/labor ratios tend to have higher productivity and hence a higher per-capita income, one would expect workers to move to wealthier areas.

Aggregate studies using average income and unemployment data generally confirm the predicted direction of migration (Vanderkamp 1976, Cançado 1997 for Brazil[7]) and have provided useful insight into the role of migration as an economic adjustment mechanism. Behavior of individual migrants does not necessarily conform to the predictions of aggregate theories. In particular, one short coming of aggregate studies

[7] Cançado (1997) uses a Solow-Swan neoclassical growth model and panel data and finds evidence that during 1960 - 91, richer regions in Brazil attracted laborers from poorer areas.

is that they are unable to explain migration from high income/low unemployment regions to regions that are on average less attractive. This pattern of migration is exactly what is being observed between Northeast and Southeast Brazil. While the SE has higher levels of income and general standards of living, in recent years the phenomenon of significant SE-NE migration has been observed. The heterogeneity of the migrant population offers an explanation of this phenomenon. Since both individual-specific characteristics and individual responses to social and economic forces matter for the migration decision, it becomes evident that relative returns to specific educational attainments in a particular region, and not its average levels of incomes or wages, are the driving force behind individual migration. Migrants from the SE to the NE, because of their heterogeneity, might be filling niches in the labor market that are education- or skill-specific.

Differences in educational attainment, location of migrants, and employment patterns documented above for migrants between the two regions suggest that individual heterogeneity rather than aggregate regional conditions are driving migration decisions. These differences further suggest that relative rates of return to educational investments between the two regions should help explain observed migration patterns. Below, we examine these rates of returns, using statistical and graphical techniques. First, we examine relative regional returns to education, without controlling for other individual attributes. Second, we note that because regional rates of return are jointly determined with the decision to migrate, we control for the endogeneity of the migration decision while estimating wages. We employ a standard version of a mover/stayer model and estimate the relative rates of return to migration.

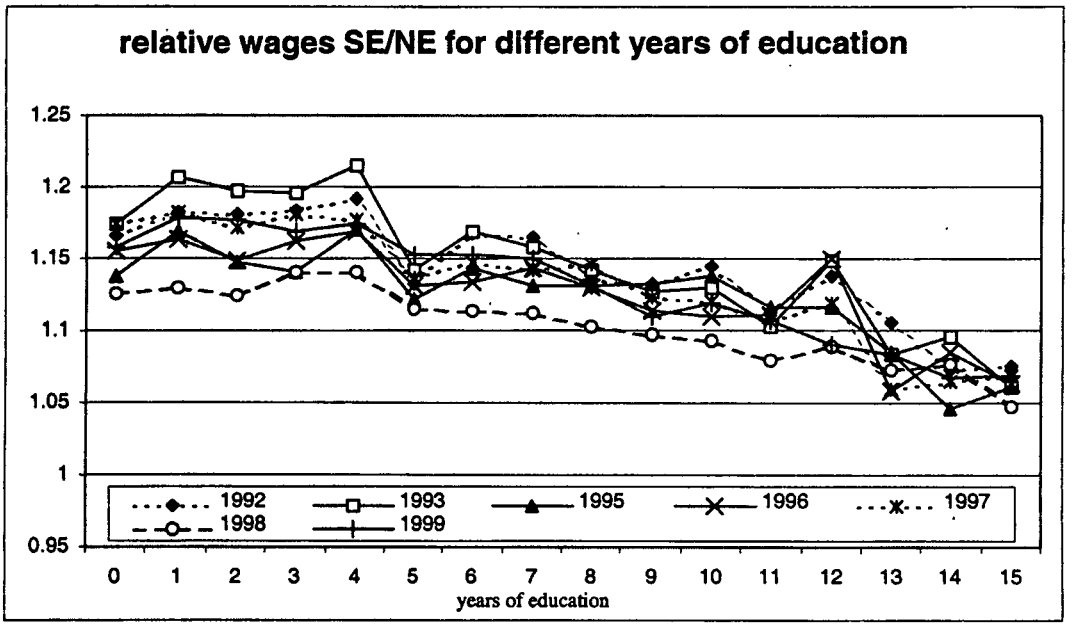
4.1 Wages and their Determinants

Wages and incomes are higher in the SE than in the NE, but relative wages between the regions converge to nearly unity for increasing levels of education. Workers with high levels of education receive similar wages in NE and SE Brazil (Figure 4.17). Low-education workers receive a 12 to 20 percent wage premium in SE Brazil (relative to NE), depending on the year of the survey, but the premium declines almost monotonically with the level of education. These findings are consistent across years of the PNAD survey used. Figure 4.1 does not, however account for the effects of age, experience and other individual factors on relative return to education.

The relationship between educational attainment and relative return to education between regions is investigated more thoroughly using two separate regressions; one regression for the NE and are for the SE. In these, log-wages for all working adults are regressed on potential experience (age-years of completed schooling – 6), years of completed schooling and 14 dummy variables, which captures the effects of 1 to15 years of completed education.[8] The SE-to-NE ratio of the coefficients on the 14 education dummy variables[9] are plotted in Figure 4.2.

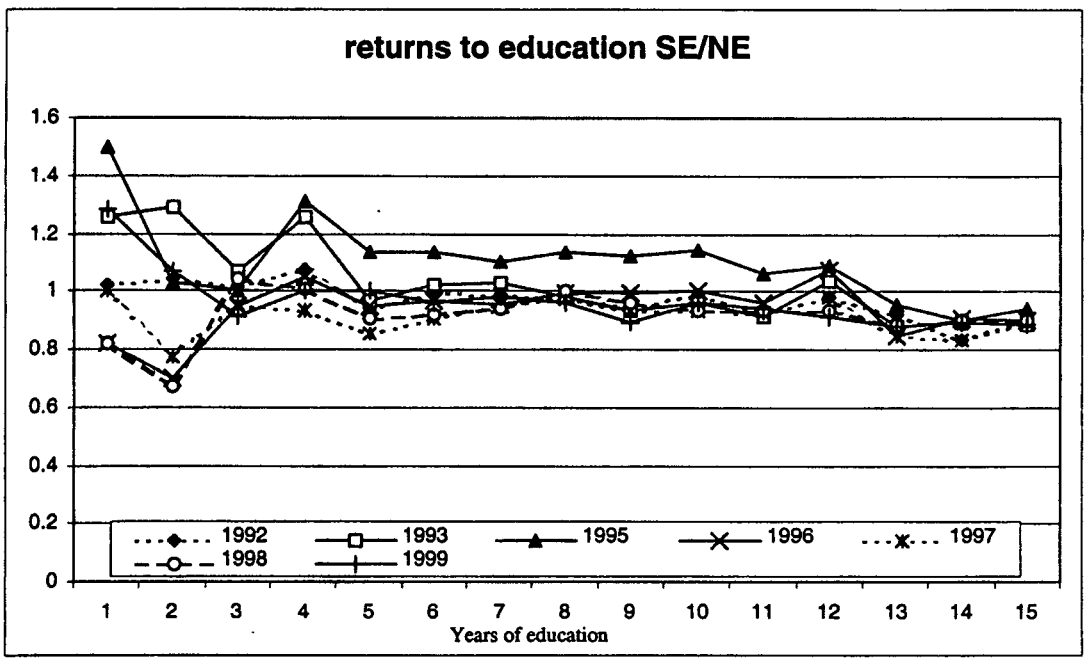
[8] See Schady (2001) for a more detailed outline of the methodology.
[9] These coefficients were obtained from separate (NE, SE) regressions based on PNADs 1992-1999 data.

Figure 4.1: Relative Wages – Southeast/Northeast



Note: The estimates are from different PNADs (1992-99). Conditional (on location) wages are calculated as wages for different years of schooling for the NE and SE.
Source: Author's calculations.

Figure 4.2: Relative Returns to Years of Schooling – Southeast/Northeast



Source: Author's calculations based on data from PNADs 1992-99.

Relative return to education, once experience is controlled for, appears to be fairly equal across regions for workers with four to eleven years of education (primary II and secondary). Relative wage premia for low-skilled workers vary dramatically across regions depending on the survey year. Returns to education are higher in the NE for more than 12 years of education for all survey years, with a relative premium of 10 to 20 percent. The findings show that returns to education, once experience is controlled for, are not systematically higher in the SE. In fact, for higher-educated individuals, returns in the NE tend to exceed those in the SE. These findings are consistent with a hypothesis of relative shortage of high-skilled workers in the NE, but are hard to reconcile with observed migration patterns. We still need to understand why NE-SE migrants have consistently higher levels of education given the slightly higher returns to higher levels of education in the NE.

4.2 A Mover/Stayer Model with Self-Selectivity

The relative wage differentials described above do not paint an accurate picture of returns to migration. Studies have demonstrated that a comparison of the estimated return to migration based on comparisons of wages for migrants versus non-migrants may be biased due to self-selection. To address the issue of self-selection, we estimate a mover/stayer model with self-selectivity. First, we lay out the mover/stayer model in some detail. Second, we describe the parameter estimates together with some of their implications. Finally, we discuss the policy significance of the results.

The model

The estimation procedure involves two stages, first the estimation of a reduced form probit to determine the selection of the population into movers and stayers, where the coefficient estimates for the movers can also be interpreted as determining the likelihood of migrating. The second stage involves the estimation of earnings functions augmented with inverse Mills ratios obtained from the probit selection regressions. For simplicity we only outline the procedure for an individual facing the choice to migration from the NE to the SE. The estimation procedure for SE to NE migration is reversed. A person is classified as a migrant if he/she has moved within the last 5 years.

We are concerned with the choice an individual faces that is based the NE and considers migrating to the SE. Let y_{NE} and y_{SE} be permanent income for an individual in the NE and SE, respectively. Ignoring differences in amenities and non-monetary factors, individual *i* will move from the NE to the SE if

$$y_{SE}-y_{NE}>C_i\,, \qquad (1)$$

where C_i are the costs of moving .

Define

$$I_i \equiv \left(\frac{y_{SE}}{y_{NE}(1+c_i)} \right), \qquad (2)$$

where $c_i \equiv C_i / y_{NE}$

Taking the log of (2), yields

$I_i \approx \ln y_{SE} - \ln y_{NE} - \ln C_i$

and the criterion for migrating becomes $I_i>0$.

Since the actual earnings of a migrant in the case if he/she would have not migrated are not observable, we follow Willis and Rosen (1979) and Robinson and Tomes (1982) and obtain estimates for $\ln y_{NE}$ and $\ln y_{SE}$ from Mincerian style earnings equations. For the Northeast and the Southeast:

$y_{NE} = \beta_{NE} X_{NE} + e_{NE}$ (3)
$y_{SE} = \beta_{SE} X_{SE} + e_{SE}$ (4)

where:

X ={years of completed schooling, experience, sector of employment, female, dummy for employed}

e = {general ability not in X, specific capital useful in NE or SE)

The actual costs of moving are unobserved, however, we observe some of the factors affecting these costs (Z), with

$c = \delta Z + e_c.$ (5)

where

Z = { family size, years of completed schooling, female, age, region of origin)

The observed income (y) is such that $y= y_{NE}$ if $I_i=1$ and $y= y_{SE}$ if $I_i=0$. That is, we only observe income in the place where the individual decides to locate. This is the crux of the problem we face in trying to measure returns to migration: we do not observe the counterfactual (what the person would have earned had he/she not migrated).

To account for movers and stayers, the earnings functions (3) and (4) have to be estimated on truncated samples. As those individuals for whom $I_i>0$ move, (4) is only estimated for NE-SE migrants:

$$E(\ln y_{SE} \mid X_i, I_i > 0) = X_i \beta_{SE} + E(e_{SE} \mid I_i > 0) \qquad (6)$$

Conversely, (3) is only estimated for stayers for whom I<0, i.e. the population of the Northeast with no history of migration:

$$E(\ln y_{NE} \mid X_i, I_i < 0) = X_i \beta_{NE} + E(e_{NE} \mid I_i < 0) \quad (7)$$

Substituting (3)-(5) into (2) yields the reduced form selection index:

$$I_i = X_i(\beta_{SE} - \beta_{NE}) - Z_i\delta + (e_{SE_i} - e_{NE_i} - e_{C_i}) \quad (8)$$

This is the selection equation: estimation of it provides information about the determinants of migration.

Using this index and under an assumption of normality, (6) and (7) can be written as:

$$E(\ln y_{SE} \mid X_i, I_i > 0) = X_i \beta_{SE} + \frac{\delta_{SE_e}}{\delta_e} \lambda_{SE_i} \quad (9)$$

$$E(\ln y_{NE} \mid X_i, I_i < 0) = X_i \beta_{NE} + \frac{\delta_{NE_e}}{\delta_e} \lambda_{NE_i} \quad (10)$$

Estimates of β_{SE} and β_{NE} are obtained by first estimating a probit regression of (8). The probit estimates can then be used to compute the inverse Mills' ratios λ_{SE_i} and λ_{NE_i} and these can then be used in the regressions (9) and (10) to obtain consistent estimates of β_{SE} and β_{NE} (Heckman 1979).

Recovery of the parameters in (9) and (10) allow us to calculate the returns from migration. We use the coefficient estimates from (9) and (10) to make linear predictions of the mean wages for movers into the NE and what they would have earned had they stayed in the Southeast. We report mean-wage predictions for different levels of education.

4.3 Findings from the Mover/Stayer Model

In this section we restrict our sample to the population older than 19 years of age with a positive wage. Table 4.1 provides summary statistics of the variables included in the analysis. The mover/stayer model consists of a number of equations. We begin by discussing the estimates of the determinants of migration (equation 8); these estimates show what types of people are more likely to migrate and help clarify some of the patterns we observed in the descriptive statistics.

Table 4.1: Summary Statistics of Variables in Mover/Stayer Models

	Movers to NE	Movers to SE	Stayers in NE	Stayers in SE
		Mean of variable:		
Age	32.88	30.89	37.35	37.17
Famsize	3.73	3.84	4.11	3.75
Expir	21.46	18.99	25.64	23.56
		Percentages shares:		
Education:				
No education	0.13	0.09	0.19	0.02
Primary I	0.32	0.35	0.26	0.27
Primary II	0.18	0.15	0.14	0.15
Secondary	0.29	0.35	0.34	0.43
University	0.08	0.06	0.07	0.13
Gender:				
Male	0.75	0.64	0.62	0.62
Female	0.25	0.36	0.38	0.38
Working Class:				
Formal	0.26	0.59	0.39	0.56
Self	0.43	0.15	0.34	0.22
Informal	0.31	0.26	0.27	0.22
Sector:				
Agriculture	0.26	0.06	0.21	0.10
Industry	0.22	0.31	0.19	0.25
Services	0.47	0.61	0.54	0.59
Public Sector	0.05	0.02	0.06	0.06
Location:				
Urban	0.69	0.93	0.75	0.88
Rural	0.31	0.07	0.25	0.12

Source: Authors' own calculation based on PNAD 1999.

Table 4.2: Probability of migrating from Southeast to Northeast

Probit estimates — Number of obs = 33369
LR chi2(10) =1038.63
Prob > chi2 = 0.0000
Log likelihood = -3042.2307 — Pseudo R2 = 0.1458

	dF/dx	Std. Err.	z	P>z	x-bar	[95 percent C.I.]	
Age	-0.0006	0.0000	-12.86	0.00	37.07	-0.0007	-0.0005
female*	-0.0062	0.0010	-6.23	0.00	0.38	-0.0081	-0.0043
Famsize	-0.0007	0.0003	-2.15	0.03	3.75	-0.0013	-0.0001
prim1*	-0.0095	0.0012	-7.04	0.00	0.27	-0.0118	-0.0071
prim2*	-0.0085	0.0010	-6.95	0.00	0.15	-0.0104	-0.0067
secu*	-0.0229	0.0018	-14.86	0.00	0.42	-0.0264	-0.0194
uni*	-0.0133	0.0009	-11.98	0.00	0.13	-0.0150	-0.0115
Minas Gerais*	-0.0281	0.0013	-20.21	0.00	0.37	-0.0306	-0.0255
Espírito Santo*	-0.0101	0.0008	-7.15	0.00	0.05	-0.0117	-0.0086
Rio*	-0.0106	0.0009	-11.49	0.00	0.24	-0.0123	-0.0089

obs. P 0.0223
pred. P 0.0106 (at x-bar)

(*) dF/dx is for discrete change of dummy variable from 0 to 1, z and P>|z| are the test of the underlying coefficient being 0

Table 4.3: Probability of migrating from Northeast to Southeast

Probit estimates — Number of obs = 28153
LR chi2(15) = 294.27
Prob > chi2 = 0.0000
Log likelihood = -2407.8167 — Pseudo R2 = 0.0576

	dF/dx	Std. Err.	z	P>z	x-bar	[95 percentC.I.	]
Age	-0.0007	0.0001	-11.04	0.00	37.23	-0.0009	-0.0006
female*	-0.0013	0.0014	-0.93	0.35	0.38	-0.0039	0.0014
Famsize	-0.0012	0.0004	-3.16	0.00	4.10	-0.0019	-0.0004
prim1*	0.0092	0.0025	4.15	0.00	0.27	0.0043	0.0141
prim2*	0.0018	0.0023	0.84	0.40	0.14	-0.0026	0.0063
secu*	0.0014	0.0019	0.75	0.45	0.34	-0.0024	0.0052
Uni*	0.0026	0.0034	0.80	0.42	0.07	-0.0041	0.0093
Maranhao*	-0.0064	0.0020	-2.57	0.01	0.06	-0.0102	-0.0025
Piauí*	0.0010	0.0032	0.32	0.75	0.04	-0.0052	0.0072
Ceará*	-0.0101	0.0013	-6.02	0.00	0.20	-0.0127	-0.0075
Rio Grande N.*	-0.0076	0.0019	-2.88	0.00	0.05	-0.0115	-0.0038
Paraiba*	0.0121	0.0039	3.88	0.00	0.05	0.0044	0.0198
Pernambuco*	-0.0078	0.0014	-4.86	0.00	0.21	-0.0105	-0.0051
Alagoas*	0.0039	0.0035	1.22	0.22	0.04	-0.0030	0.0107
Sergipe*	-0.0070	0.0021	-2.49	0.01	0.04	-0.0111	-0.0028

obs. P .0181508
pred. P .0137763 (at x-bar)

(*) dF/dx is for discrete change of dummy variable from 0 to 1,z and P>|z| are the test of the underlying coefficient being 0.

Selection Probit – Likelihood of Migration

Larger families, older workers, and women are less likely to migrate in either direction (Tables 4.2 and 4.3). The finding that single males are more likely to migrate is fairly common among studies of migration. These findings hold independent of the direction of migration.

The differences in the education coefficients over movers and stayers in the NE and the SE reveal an interesting picture (Table 4.2). The negative and significant coefficients for movers with primary I, primary II, secondary or university education indicate that workers with no education are most likely to migrate from the SE to the NE. The propensity to migrate from the SE to the NE decreases with level of attained education. A worker with primary I, primary II, secondary or university education is 0.95 percent, 0.85 percent, 2.3 percent, and 1.3 percent, respectively, less likely to migrate to the NE than a worker with no education.

The effect of education on migration into the SE is opposite that in the NE, but statistically weaker. The positive coefficients for all education levels in the probit for Northeast to Southeast migrants indicate that the propensity to migrate to the SE increases with education. However, only the coefficient on primary I education is statistically significant; workers with primary I education are statistically more likely to migrate into the SE than workers with no education. As education level increases, however, there is no significant difference in probability of migration compared to low-educated workers. Thus, while we earlier observed a pattern of migration that increased divergence in levels of human capital, when we control for other factors such as age and family size, we find no propensity for increased migration of well-educated workers from the NE to the SE. The SE, on the other hand, tends to send less-educated workers to the NE.

The regional dummies capture general characteristics specific to the region of origin such as unemployment. Compared to workers in the state of São Paulo, we find that workers in Rio de Janeiro, Espírito Santo, or Minas Gerais are less likely to migrate from the SE to the NE. For the Northeast, compared to Bahia, workers in Piauí, Paraíba, and Alagoas have a higher propensity to migrate to the SE, while workers in the other Northeastern states, from fast growing states, are less likely to migrate. As SE unemployment is highest in São Paulo (see Table 4.6) the high propensity to migrate from São Paulo to the NE might indicate that workers move to the NE in search of employment, providing further evidence that Northeast migration is in partly related to job search (see section 3.3).

Wage Regressions

The coefficients form the log-wage regressions for movers and stayers for both migration directions are consistent in sign and similar in magnitude. Age, education, gender, and sector of employment affect wages earned in a typical fashion (Chiswick 1974), women in the SE and younger and less experienced workers receive lower wages. For instance, women in the SE receive wages between 33 percent and 36 percent below their male

counterparts, holding all other factors constant. In the NE, women, whether movers or stayers, earn about 44 percent below the wages of their male counterparts. The premium to experience holds over the entire range of plausible levels of the variable. That is, an additional year of experience is rewarded with a higher wage.

Education is also rewarded with a wage premium. In all cases, holders of secondary and university-level education receive a substantial wage premium over uneducated workers, while rewards for primary education are substantially smaller. These findings hold independently of being a mover or a stayer and of the direction of migration, though fewer coefficients are significant in the mover equations. In particular, there appears to be no statistically significant reward to primary education (over uneducated workers) for movers either from the NE to the SE or from the SE to the NE.

The sign of the coefficient on the other independent variables are similar across the different models and consistent with expectation. Workers in the informal sector and self-employed workers earn less, while those in the industry, services, and public sectors receive higher wages. Interestingly, the coefficients for the movers into the NE (SE) for these variables are larger than those for the stayers in the NE (SE), which indicates that migration might be an efficient sorting mechanism. The movers receive a wage premium (compared to existing residents) that compensates them for the cost of their journey.

The coefficients on λ (the inverse Mills ratio) provide information on the existence of selection bias in the mover or stayer category. For instance, they provide an indication of whether a stayer in the Southeast has earnings (in the SE) above the average taken over both movers and stayers (in the SE), and if a SE-NE migrant earns more in the Northeast than he/she would have if he/she remained in the Southeast. As λ is negative (-0.023) only for movers from the Northeast, this implies a positive selection of SE migrants into the movers' group. That is, people who actually moved out of the Northeast earned more in the Southeast than the stayers in the Northeast would have had they also moved (Table 4.5).

A positive and borderline significant λ (at the 5 percent level) with a value of 0.225 for movers to the Northeast indicates that people who actually moved out of the SE earned more in the NE than the stayers in the SE would have had they also moved (Table 4.4). This finding is confirmed by estimates of returns to migration in the following section and indicates that migration to the Northeast can in part be explained by the human capital model of migration. However, λ is only strongly significant for stayers in the SE and the sign of λ in the other equations should therefore be only taken as being indicative. Thus, there appears to be only limited significance of selection; in the case of movers to the SE and stayers in the NE, selectivity is not a statistically significant problem.

Table 4.4: Mover/Stayer Model: Wages Stayers in the SE and Movers from SE to NE

Movers to Northeast					**Stayers in Southeast**			
Number of obs = 743					Number of obs = 32626			
F(14, 728) = 45.81					F(14, 32611) = 1927.19			
Prob > F = 0.0000					Prob > F = 0.0000			
R-squared = 0.4903					R-squared = 0.4632			
Root MSE = .78864					Root MSE = .68783			
	Wage Regressions							
	Mover				**stayer**			
	Coef.	P>z	[95 %Conf.	Interval]	Coef.	P>z	[95 %Conf.	Interval]
Expir	0.0206	0.06	-0.0008	0.0420	0.0458	0.00	0.0436	0.0480
$expir^2$	-0.0002	0.28	-0.0006	0.0002	-0.0006	0.00	-0.0006	-0.0005
prim1	-0.0634	0.50	-0.2476	0.1208	0.0913	0.00	0.0613	0.1213
prim2	-0.1729	0.08	-0.3641	0.0184	0.0807	0.00	0.0520	0.1094
Secu	0.3805	0.01	0.1132	0.6478	0.7866	0.00	0.7552	0.8179
Uni	1.8368	0.00	1.4708	2.2029	1.7947	0.00	1.7558	1.8336
Female	-0.5544	0.00	-0.7004	-0.4083	-0.4497	0.00	-0.4668	-0.4325
Self	-0.5506	0.00	-0.7020	-0.3992	-0.2138	0.00	-0.2363	-0.1914
Informal	-0.5083	0.00	-0.6504	-0.3663	-0.4617	0.00	-0.4801	-0.4434
Ind	0.4466	0.00	0.2581	0.6352	0.0925	0.00	0.0622	0.1227
Serv	0.4919	0.00	0.3044	0.6794	0.0480	0.00	0.0185	0.0775
Public	0.5337	0.00	0.2188	0.8487	0.1292	0.00	0.0876	0.1708
Rural	-0.2285	0.00	-0.3761	-0.0809	-0.2726	0.00	-0.2997	-0.2455
Const.	4.3683	0.00	3.9143	4.8224	4.8626	0.00	4.8107	4.9144
λ:	0.2248	0.04	0.0098	0.4398	-2.5891	0.00	-2.7400	-2.4381

Source: Author's own calculations based on PNAD 1999.

Table 4.5: Mover/Stayer Model: Wages, Stayers in NE and Movers from NE to SE

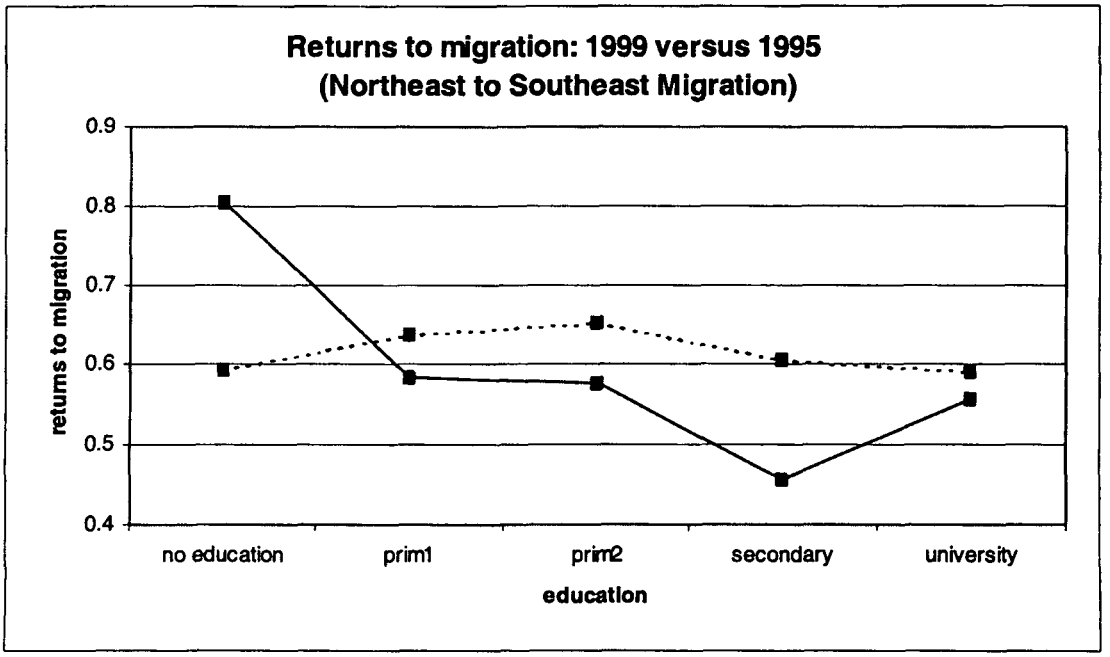
Mover to Southeast					**Stayers in Northeast**			
Number of obs = 511					Number of obs = 27642			
F(14, 496) = 17.84					F(14, 27627) = 1413.36			
Prob > F = 0.0000					Prob > F = 0.0000			
R-squared = 0.3978					R-squared = 0.4461			
Root MSE = .5985					Root MSE = .72898			
	Wage Regressions							
	Mover				**stayer**			
	Coef.	P>z	[95 %Conf.	Interval]	Coef.	P>z	[95 %Conf.	Interval]
Expir	0.0111	0.32	-0.0110	0.0333	0.0376	0.00	0.0350	0.0403
$expir^2$	0.0000	0.89	-0.0004	0.0005	-0.0005	0.00	-0.0005	-0.0005
prim1	-0.1135	0.14	-0.2624	0.0354	0.0959	0.00	0.0700	0.1219
prim2	0.0704	0.36	-0.0817	0.2225	0.0878	0.00	0.0592	0.1164
Secu	0.2523	0.01	0.0684	0.4361	0.6655	0.00	0.6360	0.6950
Uni	1.4701	0.00	1.1211	1.8191	1.7877	0.00	1.7399	1.8354
Female	-0.3927	0.00	-0.5129	-0.2725	-0.5613	0.00	-0.5812	-0.5413
Self	-0.1905	0.06	-0.3885	0.0075	-0.4623	0.00	-0.4865	-0.4381
Informal	-0.3177	0.00	-0.4346	-0.2008	-0.5001	0.00	-0.5206	-0.4795
Ind	0.1848	0.16	-0.0759	0.4455	0.2374	0.00	0.2058	0.2690
Serv	0.1076	0.42	-0.1516	0.3669	0.2792	0.00	0.2484	0.3101
Public	0.5799	0.03	0.0589	1.1008	0.3837	0.00	0.3370	0.4305
Rural	-0.4018	0.00	-0.6572	-0.1463	-0.1198	0.00	-0.1447	-0.0949
Const.	5.6581	0.00	4.9256	6.3906	4.5566	0.00	4.4918	4.6215
λ:	-0.0233	0.88	-0.3353	0.2886	0.2881	0.18	-0.1304	0.7067

4.4. Returns to Migration

As an estimate of the returns to migration, we use the coefficient estimates from the wage regression in Tables 4.4 and 4.5 to form linear predictions by region of the mean wages for actual movers and for movers had they stayed. The selectivity-corrected differences in mean wages for different levels of education are graphed in Figures 4.3 and 4.4. [10]As a test of the robustness and stability of our findings over time, we repeat this exercise for information based on the PNAD 1995. This enables us to contrast the returns to migration for migrants from 1990 to 1995 (based on the PNAD 1995) with migrants from 1995 to 1999 (based on the PNAD 1999).

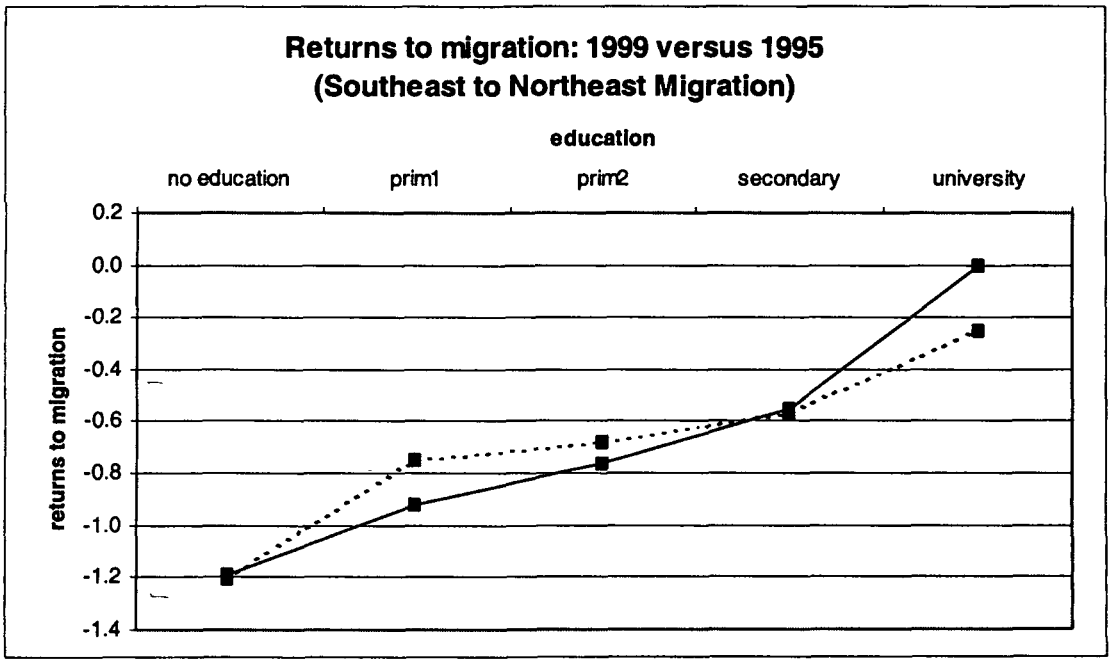
[10] We also predicted mean wages from simple OLS regressions without correcting for self-selectivity. The findings did not differ from the selectivity-corrected estimates.

Figure 4.3



Note: Solid lines mark estimations based on PNAD 1999, dotted lines mark estimates from the PNAD 1995 Returns to migration are expressed as the difference in predicted log-mean wages between movers and movers had they stayed. *Source:* Author's calculations based on PNAD 1999 and 1995.

Figure 4.4



Note: Solid lines mark estimations based on PNAD 1999, dotted lines mark estimates from the PNAD 1995 Returns to migration are expressed as the difference in predicted log-mean wages between movers and movers had they stayed.
Source: Author's calculations based on PNAD 1999 and 1995.

A common feature in returns to migration based on wages is that independent of using data from 1995 or 1999 the return to migration are increasing with education for SE-NE migrants and decreasing for NE-SE migrants. Returns to migration for SE-NE migrants with at least secondary education have increased between 1995 and 1999. Returns to migration for NE-SE migrants slightly decreased for migrants with primary I and above education during 1995-99.

In sum, the findings in this section provide some evidence that returns to migration have been decreasing for NE-SE migrants and increasing for SE-NE migrants during 1995-99. These findings are consistent with the increased migration to the Northeast and the decreased migration to the Southeast documented earlier. The predicted positive returns to migration for NE-SE migrants indicate that people migrating from the NE to the SE in search of higher remuneration. The estimated lower and generally negative returns to migration for SE-NE migrants indicates that it is likely that non-monetary factors play a role in SE-NE migration such as lower levels of violence and warmer climate. The negative returns to migration for SE-NE migrants may also indicate that costs of living in the Southeast are substantially higher than in the Northeast and that the spatial deflators suggested by Ferreira, Lanjouw, and Neri (1999) might not be sufficient to fully account for regional differences in the cost of living.[11]

As already mentioned, we only observe income in the place where the individual decides to locate. The crux of the problem of measuring returns to migration is that we only observe income in the place where the individual is now locating, and we do not observe the counterfactual (what the person would have earned had he/she not migrated). If a SE-NE migrant were unemployed prior to migration, but found employment in the NE, negative returns to NE migration might be consistent with an economic explanation of migration. Unemployment in the SE in 1999 was for the whole 3.2-percentage-points higher than in the NE (Table 4.6). Differences between states are even more pronounced. Rio Grande do Norte and Piauí have an unemployment rate of 9.2 percent and 3.4 percent respectively, compared to 15.8 percent in metropolitan São Paulo. Given that 75.1 percent of all migrants from the SE originated in the State of São Paulo, high unemployment might therefore well be responsible for a lazy share of the migration.[12]

[11] This is further highlighted by the fact that if we repeat our analysis without spatial deflation, the findings do not change significantly.

[12] A research question that emerges is why labor markets within the SE do not exhibit the flexibility to absorb the unemployed and leave migration as a viable solution. An attempt to address the impact of unemployment on the returns to migration would be to weigh returns of migration with respective probabilities for unemployment within a state. Further research is needed here.

Table 4.6: Unemployment rates by region and state

	1997	1998	1999
Northeast	**6.7**	**7.1**	**8.0**
Maranhão	3.5	3.4	4.3
Piauí	3.8	4.9	3.4
Ceará	6.1	6.2	6.3
RM Fortaleza	10.3	11.0	12.2
Rio Grande do Norte	8.9	7.6	9.2
Paraíba	5.6	5.6	7.8
Pernambuco	8.5	8.1	10.1
RM Recife	13.2	14.7	14.1
Alagoas	7.5	11.4	13.7
Sergipe	6.0	10.2	8.9
Bahia	7.7	8.1	9.1
RM Salvador	16.2	17.2	19.2
Southeast	**9.0**	**10.8**	**11.2**
Minas Gerais	6.4	8.2	8.7
RM Belo Horizonte	9.7	12.7	14.3
Espírito Santo	6.5	6.7	8.2
Rio de Janeiro	9.3	10.8	11.4
RM Rio de Janeiro	9.6	11.1	11.5
São Paulo	10.3	12.4	12.6
RM São Paulo	12.6	14.9	15.8
Brazil	**7.8**	**9.0**	**9.6**

Source: IBGE

5. Migration and Schooling of Children

We have seen evidence that migration tends to make the migrants themselves better off. Recent migrants to both the NE and then SE are not as generally well off as longer-term migrants and migrants, particularly in the NE, seem to improve their employment prospects over time. A remaining question is the impacts of migration on use of public infrastructure, in particular schooling. While the decision to migrate is primarily taken by the household head, all family members incur potential costs. Non-monetary resettling costs might be particularly high for children, as they have to adjust to different schools and curricula. The difference in school attendance probabilities between children of migrants and non-migrants in both regions is not very pronounced and participation rates for all children are close to 90 percent (Table 5.1). However, school attendance for children from migrants to the SE is about 5-percentage-points lower than for the average school-aged child in the SE, suggesting that children of recent migrants may be educationally disadvantaged.

Differences in school performance, as measured by age-appropriate grade enrollment, for migrant versus non-migrant children are more evident. Children of

migrants from the NE to the SE do worse than the average child in the receiving area, while children of migrants from the SE to the NE do better than the NE average. Only 60 percent of children who migrated within the last 5 years to the SE are in the school grade corresponding to their age, compared to the average of 77 percent for children in the SE. The corresponding figures for migrants to the NE are 70 percent for migrants compared to 59 percent for the non-migrant population. Girls have better school attendance and school performance than boys; a finding independent of the region as well of the migration status.

5.1 Determinants of School Participation and Advancement

The above mentioned summary statistics indicate that the participation of children in school and their ability to advance may be affected by the migration decision. To address this issue, we perform two regressions. The first examines whether children of migrants are less likely to attend school. The second identifies if children of migrants have difficulties in catching up in or adjusting to school by examining the degree to which migrant children are in the proper grade given their age. Both regressions are run separately for the NE and the SE to account for regional effects. School officials in areas receiving large numbers of migrants may use such information to design interventions to assist children of recent migrants.

The two equations are estimated using the probit regression technique. The school attendance equation has a 0-1 variable for school attendance as the dependent variable, it takes the value 1 if a school child attends the appropriate grade according to his or her age and the value 0 if he or she is behind grade. The independent variables in each equation include household size; its squared term; gender; incidence of poverty (P0); a household head with primary I, primary II, secondary or university education; a dummy for a female-headed household; and a dummy variable to capture the impact of migration within the last 5 years. The sample for the school attendance equations is limited to children age 7-18. The school performance equation sample only includes children attending school.

5.2 Findings

The coefficient on the variables in the model of school attendance all tend to be highly significant, but relatively small in size (Tables 5.2 and 5.3). They are broadly consistent for both regions. Independent of the region of residence, girls are more likely to attend school than boys. In the NE and the SE, girls are 0.18 percent and 0.13 percent respectively more likely to attend schools than their male peers. Children being brought up in poor households are significantly less likely to attend school than their non-poor peers, indicating that economic barriers to educational attainment may exist in both regions. Children from larger households are more likely to attend school, controlling for other factors. This result might indicate a peer effect within families. The education of the household head is a very important determinant of the likelihood of attending school; it is statistically significantly and positively correlated with school attendance for both regions.

Regional differences are present with regard to the effect of the gender of the household head on school attendance. Children from female-headed households in the NE are more likely to attend school than children in male-headed households, while their peers in the SE are less likely to attend school compared to children in male-headed households.

Migration is negatively and significantly correlated with school attendance in the SE and an insignificant determinant of attendance in the NE. That is, migration is an important factor in explaining school attendance in the SE while not in the Northeast even after taking the educational status of parents into account.

Table 5.1: School Attendance and On-Age Performance for Migrant and All Children, Northeast and Southeast Regions.

	Migrants to NE	Northeast	Migrants to SE	Southeast
	School Attendance (percent attending):			
Total	86.5 (85.7)	87.2	83.6 (81.3)	89.2
Male	84.9 (84.6)	86.7	83.5 (82.8)	88.8
Female	88.1 (86.8)	87.8	83.7 (79.8)	89.5
	School Performance (percent on-age):			
Total	60.9 (70.1)	58.5	64.5 (60.3)	77.2
Male	56.7 (71.0)	54.5	61.5 (59.1)	74.3
Female	64.8 (69.2)	62.5	67.4 (61.4)	80.2

Note: Numbers in brackets represent the respective figure for migration within the last 5 years Non-bracketed numbers are for ever-migrated. *Source:* Author's own calculations based on PNAD 1999.

Table 5.2: Marginal Effects for School Attendance in Northeast of Brazil

Probit estimates — Number of obs = 29154
LR chi2(9) =1091.06
Prob > chi2 = 0.0000
Log likelihood = -10606.462 — Pseudo R2 = 0.0489

	dF/dx	Std.Error	Z	P>|z|	x-bar	[95 %	C.I.]
female*	0.018	0.004	4.680	0.000	0.496	0.010	0.025
Famsize	0.088	0.004	23.990	0.000	5.260	0.081	0.095
fam^2	-0.006	0.000	-21.400	0.000	31.840	-0.006	-0.005
P0*	-0.057	0.004	-13.740	0.000	0.580	-0.065	-0.050
prim1H*	0.075	0.004	17.270	0.000	0.275	0.068	0.083
prim2H*	0.047	0.005	8.800	0.000	0.149	0.038	0.056
secH*	0.037	0.006	5.080	0.000	0.074	0.024	0.049
femHH*	0.020	0.004	4.440	0.000	0.238	0.012	0.029
m5Ynese*	-0.013	0.016	0.840	0.403	0.015	-0.045	0.019

obs. P: 0.872024 — pred. P: 0.883237 (at x bar)
(*) dF/dx is for discrete change of dummy variable from 0 to 1
z and P>|z| are the test of the underlying coefficient being 0

Note: Variable uniH was dropped during probit estimation.
Source: Author's own calculations based on PNAD 1999.

Table 5.3: Marginal Effects for School Attendance in Southeast of Brazil

Probit estimates — Number of obs = 25763
LR chi2(9) = 874.88
Prob > chi2 = 0.0000
Log likelihood = -8489.9813 — Pseudo R2 = 0.0490

	dF/dx	Std.Error	Z	P>|z|	x-bar	[95 %	C.I.]
female*	0.013	0.004	3.570	0.000	0.490	0.006	0.021
Famsize	0.056	0.004	14.130	0.000	4.738	0.049	0.064
fam^2	-0.004	0.000	-13.870	0.000	25.125	-0.005	-0.004
P0*	-0.047	0.005	-9.380	0.000	0.218	-0.057	-0.036
prim1H*	0.085	0.004	18.640	0.000	0.336	0.077	0.093
prim2H*	0.028	0.005	5.770	0.000	0.241	0.019	0.037
secH*	-0.002	0.006	-0.440	0.662	0.161	-0.014	0.009
femHH*	-0.025	0.005	-5.210	0.000	0.220	-0.035	-0.015
M5Ysene*	-0.080	0.020	-4.840	0.000	0.015	-0.119	-0.041

obs. P: 0.889997 — pred. P: 0.900897 (at x bar)
(*) dF/dx is for discrete change of dummy variable from 0 to 1
z and P>|z| are the test of the underlying coefficient being 0

Note: Variable uniH was dropped during probit estimation.
Source: Author's own calculations based on PNAD 1999.

The findings with respect to school performance (i.e. is the child in an appropriate grade given his or her age?) (Tables 5.4 and 5.6) are similar to those for attendance. Girls in both regions are less likely to repeat than their male peers. Younger students and students from poor households are more likely to repeat in both regions. The education of the household head is an important determinant of the school performance of a child. Children whose parents have secondary or higher education are 39 percent (24 percent) more likely to be in the appropriate grade given their age in the NE (SE) compared to children whose parents have no education, which is the reference group. There is a positive correlation between school performance and the education of the household head if the household head has completed primary II or secondary education. As in the school attendance equations, we observe a regional difference for children from female-headed households. Children from female-headed households in the Northeast do better than children of those from male-headed households, but in the SE, those in female-headed households are nor better nor worse off.

The migration dummy, *my5sene*, is again significant for NE-SE migrants. Children of migrants from the NE to SE are nine percent more likely to fall behind in school compared to the rest of the SE population.

Table 5.4: Marginal Effects for Correspondence of School Age and Grade -- NE

Probit estimates — Number of obs = 25423
LR chi2(9) =14444.79
Prob > chi2 = 0.0000
Log likelihood = -10026.014 — Pseudo R2 = 0.4187

	dF/dx	Std.Error	z	P>|z|	x-bar	[95 %	C.I.]
female*	0.073	0.007	10.170	0.000	0.499	0.059	0.087
Age	-0.489	0.013	-32.880	0.000	12.430	-0.515	-0.463
age^2	0.013	0.001	23.960	0.000	164.834	0.012	0.014
P0*	-0.143	0.007	-18.880	0.000	0.565	-0.157	-0.128
prim1H*	-0.020	0.009	-2.220	0.026	0.289	-0.038	-0.002
prim2H*	0.261	0.007	31.300	0.000	0.152	0.248	0.274
secH*	0.389	0.005	52.020	0.000	0.076	0.379	0.399
femHH*	0.009	0.008	1.090	0.274	0.236	-0.007	0.026
m5yNESE*	0.039	0.029	1.280	0.202	0.015	-0.019	0.096

obs. P: 0.585494 — pred. P: 0.687906 (at x bar)
(*) dF/dx is for discrete change of dummy variable from 0 to 1
z and P>|z| are the test of the underlying coefficient being 0

Note: Variable uniH was dropped during probit estimation.
Source: Author's own calculations based on PNAD 1999.

The negative correlation between NE-SE migration and school attendance as well as school performance, and evidence from descriptive statistics in Table 5.1 indicate that children of NE-SE migrants have more difficulties in catching up in school than children of SE-NE migrants. This could be due to lower quality of education in the NE. Children of NE-SE migrants therefore have more difficulty adapting to new school curricula in the SE. Therefore it might be useful to provide additional instruction to children from NE-SE migrants. Alternatively, efforts to improve the educational quality in the NE might be warranted.

Table 5.5: Marginal Effects for Correspondence of School Age and Grade -- SE

Probit estimates — Number of obs = 22929
LR chi2(9) =8922.30
Prob > chi2 = 0.0000
Log likelihood = -7966.8103 — Pseudo R2 = 0.3590

	dF/dx	Std.Error	Z	P>|z|	x-bar	[95 %	C.I.]
female*	0.036	0.005	7.490	0.000	0.492	0.027	0.046
age	-0.127	0.009	-11.970	0.000	12.371	-0.146	-0.109
age^2	0.001	0.000	3.000	0.003	163.765	0.000	0.002
P0*	-0.077	0.007	-11.650	0.000	0.209	-0.092	-0.063
prim1H*	-0.120	0.008	-14.810	0.000	0.356	-0.136	-0.103
prim2H*	0.090	0.005	14.660	0.000	0.241	0.079	0.100
secH*	0.238	0.005	51.610	0.000	0.154	0.227	0.248
femHH*	-0.014	0.006	-2.380	0.017	0.210	-0.026	-0.002
m5ySENE*	-0.093	0.027	-3.940	0.000	0.014	-0.146	-0.039

obs. P: 0.767718 — pred. P: 0.867629 (at x bar)
(*) dF/dx is for discrete change of dummy variable from 0 to 1
z and P>|z| are the test of the underlying coefficient being 0

Note: Variable uniH was dropped during probit estimation.

Source: Author's own calculations based on PNAD 1999.

In sum, there appears to be evidence of a vicious cycle: children in poor households are less likely to attend school and be on-grade, and parents with low education have children who lag behind or do not attend school. This is evidence of an-intergenerational transfer where children who are born into poverty are likely to continue being poor. The results show that there are economic barriers to educational attainment, and unless public interventions in the form of early assistance to educationally at risk children are made, these children will most likely never escape poverty.

6. Summary and Conclusions

Migration continues to be an important phenomenon in Brazil, and as many as 40 percent of Brazilians have migrated at some time in their lives. Northeast Brazil has historically been characterized as a source of migrant outflow, and most out migrants from the Northeast settled in the Southeast. The major migration routes in Brazil continue to be Southeast to Northeast and Northeast to Southeast. While the Northeast has recently undergone comparatively strong economic growth, large gaps between mean incomes and levels of living of the NE and SE persist. This paper sheds some light on the determinants of migration between regions and some of the impacts of migration decisions on households and regions.

The paper's findings show differences between migrants to the SE from the NE and migrants from the NE to the SE. These differences explain why the migration patterns emerge: different groups seek rewards in different areas. SE-NE migrants are on average poorer and less well educated than the Southeast average, while NE-SE migrants are financially better off and better educated than the Northeast average. This pattern is troublesome, as it signals that the economic divergence between the Southeast and the Northeast may grow as a result of migration.

The estimation of returns to migration provides insight into the changes in returns to migration over time. We find that a common feature in the predicted returns to migration is that the returns to migration are increasing with education for SE-NE migrants and decreasing for NE-SE migrants.

We further find that returns to migration have been decreasing for NE-SE migrants and increasing for SE-NE migrants between 1995 and 1999. The predicted positive returns to migration for NE-SE migrants indicate that NE-SE migrants move to the SE in search of higher remuneration. The estimated lower returns to migration for Southeast to Northeast migrants provide only limited support for the human capital approach to migration and indicate that non-monetary factors may also have a role to play in SE-NE migration. Returning migrants to the Northeast may be due to adaptation

difficulties or a like in the Southeast, and most [13] Southerners maybe leaving their region of origin for fear of crime.

[13] The 1988 Federal Constitution established the universal right to social security and instituted special eligibility conditions for rural workers under the *Regime Geral da Previdência Social* (RGPS), Brazil's public pension system for workers in the private sector. This right was officially extend to rural areas in 1993. Recent analysis based on the 1996-1997 *Pesquisa sobre Padrões de Vida* (PPV) survey, found that the proportion of rural households receiving pensions from public institutions averages 30 percent in Brazil's poorer Northeast, and 24 percent in the Southeast. Delgado (1999), Beltrao et. al. (1999) and others find that the implementation of the 1988 eligibility and benefit criteria has been effective in lowering the incidence of poverty among rural households in particular in the Northeast.
The increase of rural migration could be indicative of such a socioeconomic impacts of the recent pension reform.

Appendix A:

Table A1: Residency in 1999

	No.
Rondônia	836,023
Acre	355,597
Amazonas	1,952,288
Roraima	197,919
Pará	3,198,177
Amapa	398,747
Tocantins	1,141,233
Maranhão	5,432,737
Piauí	2,738,634
Ceará	7,128,413
Rio Grande do Norte	2,661,540
Paraíba	3,380,752
Pernambuco	7,594,177
Alagoas	2,719,073
Sergipe	1,719,299
Bahia	1.3E+07
Minas Gerais	1.7E+07
Espírito Santo	2,948,009
Rio de Janeiro	1.4E+07
São Paulo	3.6E+07
Paraná	9,402,912
Santa Catarina	5,114,846
Rio Grande do Sul	9,996,461
Mato Grosso do Sul	2,033,859
Mato Grosso	2,385,812
Goiás	4,873,181
Distrito Federal	1,980,740
Total	1.6E+08

Source: Author's own calculations based on PNAD 1999.

Appendix B: Variable Declarations

age:	age
age^2:	squared age
emplyd:	0-1 dummy for employed
escola:	0-1 variable, 1: child attends school
expir:	experience (age-school-6)
$expir^2$:	experience squared
famsize:	family size
fam^2:	famsize squared
female:	0-1 gender dummy for women
femHH:	0-1 dummy for female household head
m5yNESE:	0-1 dummy for migrants from the SE into NE over the last 5 years
m5ySENE:	0-1 dummy for migrants from the NE into SE over the last 5 years
moverNS:	linear predicted wage/income for migrants from NE to SE
moverSN:	linear predicted wage/income for migrants from SE to NE
NE:	Northeast
P0:	0-1 dummy for household income below poverty line of R$ 65 in 1997 prices
prim1:	0-1 dummy for primary1 education (4years of schooling)
prim1H:	0-1 dummy for household head with primary1 education (4years of schooling)
prim2:	0-1 dummy for primary2 education (8 years of schooling)
prim2H:	0-1 dummy for household head with primary2 education (8 years of schooling)
scholage:	0-1 variable, scholage if 1 if: - primary1-aged pupile (+/-1 one year, i.e. 7 to 10 years old) attending primary1 - primary2-aged pupile (+/-1 one year, i.e. 10 to 14 years old) attending primary2 - secondary-aged pupile (+/-1 one year, i.e. 14 to 18 years old) attending
school:	years of completed schooling
SE:	Southeast
secH:	0-1 dummy for household head with secondary education
secu:	0-1 dummy for secondary education (11 years of schooling)
stayerNN:	linear predicted wage/income for non-migrants in NE
stayerSS:	linear predicted wage/income for non-migrants in SE
uni:	0-1 dummy for higher education (more than 11 years of schooling)
uniH:	0-1 dummy for household head with higher education (more than 14 years of schooling

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